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13. Abstract *(Maximum 200 words).*

The presence of a mean dynamic topography in the reference surface used to calculate altimetric sea-surface height (SSH) residuals leads to significant difficulty in interpretation. When the "geoid" is subtracted from an individual pass the mean dynamic topography is also subtracted, leading to artifacts such as apparent counterflow as strong as the Gulf Stream itself. Several "synthetic geoid" methods have been developed to address this problem. One particularly simple approach involves a mathematical representation of mean and instantaneous Gulf Stream profiles. The method employs a least-squares fit to SSH residuals to determine model parameters. The modeled mean Gulf Stream is then added to the SSH residual profile to allow a better depiction of the instantaneous Gulf Stream.

This method works well, but suffers from the practical difficulty that convergence is often not achieved unless the initial parameter estimates are close to the correct values. We turned to genetic algorithms (GAs) in an effort to find a more robust approach. GAs are search techniques that are based on the mechanics of natural selection. GAs apply the "generate and test" search procedure iteratively over a large set of candidate solutions. They search large numbers of candidate solutions simultaneously, and they use random search and/or selection rather than determinsitic methods. GAs have been used in a number of optimization problems, but to our knowledge this is their first application to curve fitting. A number of novel variations on the basic method are necessary. The "organisms" in a GA represent solutions to the problem, in this case the values of the parameters of a model that involves the difference of two hyperbolic tangent terms. The method requires input of the ranges in which the parameters lie. More accurate results are obtained with smaller ranges, i.e., better initial estimates of the parameters. However, one can obtain*

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*accurate results with very little prior knowledge with some experimentation.
The GA approach to fitting this SSH model to altimeter data is easily implemented, is accurate, and provides consistent results. We show specific examples of the application of this technique to GEOSAT altimeter data SSH residuals.

(cont)
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